

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re the Application

Inventor : **Buczak**
Application No. : **10/029,830**
Filed : **December 27, 2001**
For : **HIERARCHICAL DECISION FUSION OF
RECOMMENDER SCORES**

APPEAL BRIEF

On Appeal from Group Art Unit 2623

Daniel Piotrowski
Registration No. 42,079

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By: Thomas J. Onka
Attorney for Applicant
Registration No. 42,053

Date: April 11, 2008

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee of the present application, Koninklijke Philips Electronics N.V., and not the party named in the above caption.

II. RELATED APPEALS AND INTERFERENCES

With regard to identifying by number and filing date all other appeals or interferences known to Appellant which will directly effect or be directly affected by or have a bearing on the Board's decision in this appeal, Appellant is not aware of any such appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-21 have been presented for examination. All of these claims are pending, stand finally rejected, and form the subject matter of the present appeal.

IV. STATUS OF AMENDMENTS

In response to the Final Office Action, dated October 16, 2007, Appellant timely submitted, on December 14, 2007, arguments believed to overcome the reasons for rejecting the claims. On January 17, 2008, an Advisory Action was entered into the record. The Advisory Action stated that the response did not place the application in a

condition for allowance. The Advisory Action in addition provided further rationale for maintaining the rejection of the claims under 35 USC §103(a). A Notice of Appeal was filed timely filed in response to the Advisory Action and this Appeal Brief is being filed, with appropriate fee, within the period of response from the date of the Notice of Appeal.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention is expressed primarily in independent claims 1 and 15. Claim 1 recites a method for providing hierarchical decision fusion of recommender scores, said method comprising the steps of: (a) providing a plurality of recommenders at a first level, said recommenders being grouped to at least one of a plurality of predetermined groups, see page 3, lines 1-6, (b) providing a predetermined number of first level fusion centers for receiving an output from each of said recommenders from at least one particular group, (c) outputting a decision by each one of said plurality of recommenders grouped in step (a) to a respective first level fusion center, wherein each decision provides a recommendation, (d) each respective first level fusion center performing a first fusing step of the decisions output in step (c) by said recommenders from said at least one particular group, (e) each respective first level fusion center outputting a first enhanced decision based on the fusion performed in step (d), see page 6, lines 6-17, (f) providing a plurality of second level fusion centers for receiving the first enhanced decisions output from a group of said first level fusion center if the first enhanced decisions are not within a predefined range; (g) each respective second level fusion center performing a second fusing step of the first enhanced decisions received

from the group of said first level fusion centers; (h) each respective second level fusion center outputting a second enhanced decision; and outputting to a user a finally enhanced decision chosen from the enhanced decisions in step (h) or (e), see page 6, line 19 – page 7, line 4 and page 7, line 16 – page 8, line 4.

Independent claim 15 recites a system for hierarchical decision fusion of recommender scores which essentially incorporates the method of claim 1.

The remaining claims, which depend from respective independent claims, express further aspects of the invention.

VI. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

The issue in the present matter is whether:

1. Claims 1-3, 5-8, 14, 15, 17, 19 and 20 are unpatentable under 35 USC 103(a) over Graves, U.S. Patent No. 5,410,344 in view of Tsai, U.S. Patent No. 6,697,504.
2. Claims 9-11 and 13 are unpatentable under 35 USC 103(a) over Graves in view of Tsai and further view of Yeh. Claim 12 is unpatentable under 35 USC 103(a) over Graves in view of Tsai and further view of Inoue. Claim 18 is unpatentable under 35 USC 103(a) over Graves in view of Tsai and further view of Yuen. Claim 21 is unpatentable under 35 USC 103(a) over Graves in view of Tsai and further view of Kim.

VII. ARGUMENT

I. 35 USC §103 Rejection of Claims 1-3, 5-8, 14, 15, 17, 19 and 20

Claims 1-3, 5-8, 14, 15, 17, 19 and 20 are not unpatentable over Graves, U.S. Patent No. 5,410,344 in view of Tsai, U.S. Patent No. 6,697,504 under 35 USC 103(a), as the combination of Graves and Tsai fail to show material elements recited in the independent claims.

Appellants respectfully submit that the pending claims are patentable for at least the following reasons.

The present invention relates to recommender systems and the fusion of recommender scores in a hierarchical fashion. More particularly, the present invention relates to a combination function for multiple recommendation agents. The present invention uses a hierarchical structure that permits greater flexibility, leading to better prediction accuracy, over the prior art. The hierarchy may not need to be utilized up to the nth level in all cases. For example, if a recommendation score is within a certain predefined range at a lower level, (for example) the second level of fusion centers, the recommendation can be made to the user without the necessity of utilizing the system resources associated with having the highest level fusion center provide the

recommendation. This flexibility can be advantageous when a recommender system is making recommendations to a plurality of users during at least a partially overlapping period. See page 7, line 21 – page 8, line 6.

It is respectfully submitted that in order to establish a *prima facie* case of obviousness, three basic criteria must be met:

1. there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the reference teachings;
2. there must be a reasonable expectation of success; and
3. the prior art reference must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Claim 1 recites the limitations of “(f) providing a plurality of second level fusion centers for receiving the first enhanced decisions output from a group of said first level fusion centers, if the first enhanced decisions are not within a predefined range;...” As indicated in the Office Action, dated October 16, 2007, Graves fails to disclose this limitation. The addition of Tsai fails to cure the infirmities of Graves.

Tsai teaches a method of multi-level facial image recognition and system. The Office Action, dated October 16, 2007, points to figure 8 and col. 4, lines 10-17 to show the above limitations. Appellants respectfully disagree. In these sections Tsai teaches that in a testing stage a test image is decomposed starting from four sub-images 101-104 having the lowest resolution. If the image can not be identified in this low resolution, the possible candidates are further recognized in a higher level of resolution.

Tsai's method of multi-level facial image recognition is not an analogous art to recommendations for a given user's preferences and fails to provide the motivation to combine as asserted in the Office Action, dated October 16, 2007, without improper hindsight by "use[ing] the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention," see *In Re Denis Rouffet*, 47 USPQ.2d 1453, 1457-58 (Fed. Cir. 1998). Tsai's use of recognition decisions it is to solve a particular problem (i.e. image recognition). The Final Office Action acknowledges that the respective systems test different data (e.g. user preferences and images), however, provides that the use of neural networks provides motivation to combine Tsai and Graves. Appellants respectfully disagree. Neural networks may be used for a number of applications and such use does not show the reasons that the skilled artisan in recommenders, confronted with the same problems as the inventor, would select the elements from the cited prior art references (in particular a different art such as image processing) for combination in the manner claimed, see *Id.*

The Advisory Action, dated January 17, 2008, indicates that “the motivation of providing a result at an earlier time than would have previously been available is a valid motivation as time is always an issue when it comes to consumer electronics. The less a customer has to wait for something to happen, the more likely the customer will be to use that feature and the more likely other people will be likely to purchase the product.” Appellants respectfully disagree that this provides motivation to combine as indicated by the Advisory Action regarding the cited references. From this conclusion, any related or non-related art that may decrease the element of time would be a valid combination with regard to 103 art rejections.

To simply state that the limitations of providing a plurality of second level fusion centers for receiving the first enhanced decisions output from a group of said first level fusion centers, if the first enhanced decisions are not within a predefined range;...” would be an obvious modification to one skilled in the art, because of a possible time reduction, begs the question. How? Nothing in Tsai and Graves teaches all of the above limitations. To allege otherwise is merely to reduce the method of claim 1 to a mere “gist” or “thrust.” Such an interpretation disregards the “as a whole” requirement of MPEP 2141.02, and distills the complexities of the actual system of Claim 1 to an abstract general buzz word, precisely the problem obviated by MPEP 2141.02. Thus, Appellants traverse this rejection.

Accordingly, since the combination of Graves and Tsai, fails to teach or suggest each and every feature of the claims as required by 35 U.S.C. 103(a). Appellants

respectfully submit that claim 1 is allowable. Claim 15 contains similar features to that of claim 1 and is allowable for at least the same reasons.

II. 35 USC §103 Rejection of Claims 1-8, 18-22

With regard to the remaining dependent claims 2-14 and 16-21, these claims ultimately depend from independent claims 1 and 15. Applicant respectfully submits that these remaining dependent claims are allowable at least for their dependence upon allowable base claims, without even contemplating the merits of the dependent claims for reasons analogous to those held in *In re Fine*, 837 F.2d 1071, 5 USPQ 2d 1596 (Fed. Cir. 1988) (if an independent claim is non-obvious under 35 U.S.C. §103(a), then any claim depending therefrom is non-obvious).

VIII. CONCLUSION

In view of the above analysis, it is respectfully submitted that the referenced teaching fails to render unpatentable or anticipate the subject matter of any of the present claims. Therefore, reversal of all outstanding grounds of rejection is respectfully solicited.

Respectfully submitted,
Daniel Piotrowski
Registration No. 42,079

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Date: April 11, 2008

By: Thomas J. Onka
Attorney for Applicant
Registration No. 42,053

VIII. CLAIMS APPENDIX

The claims which are the subject of this Appeal are as follows:

1. A method for providing hierarchical decision fusion of recommender scores, said method comprising the steps of:

(a) providing a plurality of recommenders at a first level, said recommenders being grouped to at least one of a plurality of predetermined groups;

(b) providing a predetermined number of first level fusion centers for receiving an output from each of said recommenders from at least one particular group;

(c) outputting a decision by each one of said plurality of recommenders grouped in step (a) to a respective first level fusion center, wherein each decision provides a recommendation;

(d) each respective first level fusion center performing a first fusing step of the decisions output in step (c) by said recommenders from said at least one particular group;

(e) each respective first level fusion center outputting a first enhanced decision based on the fusion performed in step (d);

(f) providing a plurality of second level fusion centers for receiving the first enhanced decisions output from a group of said first level fusion center, if the first enhanced decisions are not within a predefined range;

(g) each respective second level fusion center performing a second fusing step of the first enhanced decisions received from the group of said first level fusion centers;

(h) each respective second level fusion center outputting a second enhanced decision; and

- (i) outputting to a user a finally enhanced decision chosen from the enhanced decisions in step (h) or (e).

2. The method according to Claim 1, wherein the plurality of recommenders provided in step (a) have overlapping topics of interest.

3. The method according to Claim 2, wherein the user's profile contains a plurality of preferences previously recorded.

4. The method according to Claim 3, wherein the previously recorded preferences comprise one of a viewing history, listening history, and literary history.

5. The method according to Claim 1, wherein the first fusing step recited in step (d) is performed by one of weighted average, voting, neural network, and Dempster-Shaffer Evidential Reasoning.

6. The method according to Claim 1, wherein the second fusing step recited in step (g) is performed by one of weighted average, voting, neural network, and Dempster-Shaffer Evidential Reasoning.

7. The method according to Claim 1, wherein step (h) further comprises (i) providing a plurality of third level fusion centers for receiving the second enhanced decisions from the second level of fusion centers, and (ii) each of the plurality of third

level fusion centers performing a third fusing step of a predetermined number of second enhanced decisions.

8. The method according to Claim 6, wherein step (h) further comprises (i) providing a plurality of third level fusion centers for receiving the second enhanced decisions from the second level of fusion centers, and (ii) each of the plurality of third level fusion centers performing a third fusing step of a predetermined number of second enhanced decisions.

9. The method according to Claim 7, wherein step (h) further comprises (iii) providing a single nth level fusion center, n being an integer greater than 3, said nth level fusion center receiving decisions output from said second level of fusion centers; and (iv) providing an nth fusing step from the second enhanced decisions.

10. The method according to Claim 8, wherein step (h) further comprises (iii) providing a single nth level fusion center, n being an integer greater than 3, said nth level fusion center receiving decisions output from said second level of fusion centers; and (iv) providing an nth fusing step from the second enhanced decisions.

11. The method according to Claim 9, wherein the nth level of fusion centers is a fourth level.

12. The method according to Claim 8, further comprising providing a single n th level fusion center, n being an integer greater than 4, said n th level fusion center receiving decisions from a plurality of $n-1$ level fusion centers, wherein said $n-1$ level fusion centers being a higher level than the third level of fusion centers.

13. The method according to Claim 11, wherein the n th fusion step is performed by one of weighted average, voting, neural network, and Dempster-Shaffer Evidential Reasoning.

14. The method according to Claim 11, wherein the finally enhanced step is output to the user via one of wire communication, wireless communication, fiber optics, LAN/WAN, and Internet.

15. A system for hierarchical decision fusion of recommender scores, said system comprising:

a central processing unit;

a memory in communication with said central processing unit;

a recommender module comprising fusion software for fusing recommendations of a predetermined number of groups;

means for outputting a recommendation to a user;

wherein said recommender module provides at least two levels of fusion, wherein a plurality of recommendations are fused at a first level to provide a plurality of first enhanced decisions, and said plurality of first enhanced decision are fused at a second

level to provide a plurality of second enhanced decisions which are fewer in number than said first enhanced decisions, if the first enhanced decisions are not within a predefined range.

16. The system according to Claim 15, wherein said memory further comprises means for storage of at least one of a viewing history, reading history and listening history.

17. The system according to Claim 15, wherein said means for outputting a recommendation to a user includes means for means for communication via one of wire communication, wireless communication, fiber optics, LAN/WAN and Internet.

18. The system according to Claim 15, wherein said memory comprises a network server.

19. The system according to Claim 15, wherein said means for outputting a recommendation to a user includes a display.

20. The system according to Claim 15, wherein said system includes means for storing a cookie on a user's storage device, said cookie containing an identifier of a user profile in said memory.

21. The system according to Claim 19, wherein the display resides in a remote control.

X. EVIDENCE APPENDIX

No further evidence is provided.

XI. RELATED PROCEEDING APPENDIX

No related proceedings are pending and, hence, no information regarding same is available.